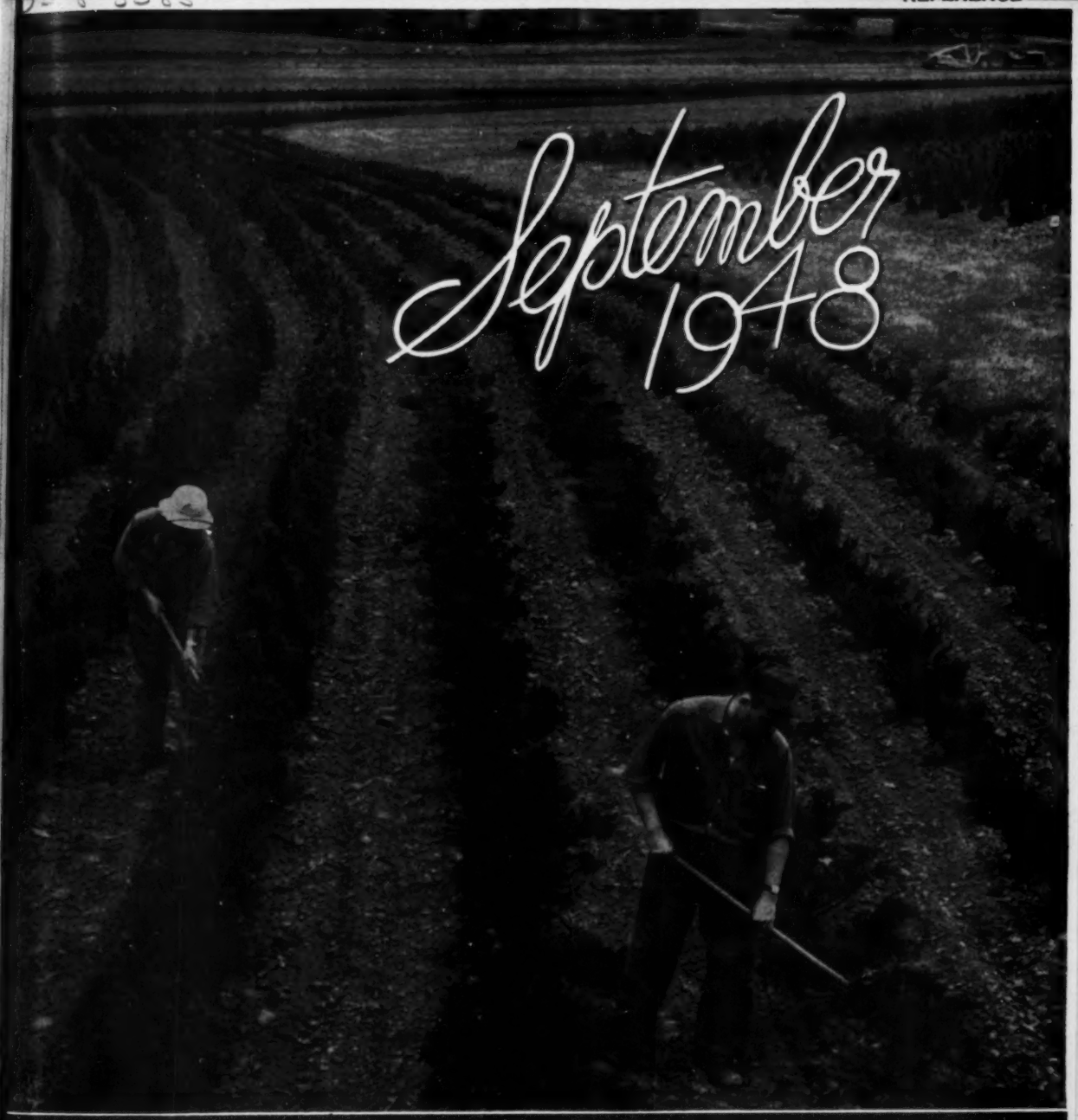

SOIL CONSERVATION

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WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with approval of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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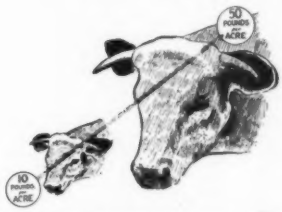

ABANDONED WHEATLAND PUT IN GRASS.—Meat production can be increased from 10 pounds per acre to 50 pounds by seeding abandoned wheatland to grass, it has been found by R. H. Stark, SCS Nursery Division, Aberdeen, Idaho, J. L. Toevs, Idaho Agricultural Experiment Station, Moscow, Idaho, and A. L. Hafenrichter, SCS Nursery Division, Portland, Oreg. This can be accomplished at a cost ranging from 55¢ to $1.60 per acre plus seed. Abandoned wheatland can be made to produce meat profitably if the land is in the unforested areas, where the rainfall is 8 inches or over annually and if the ranch has some ground that once was cropped, or can be plowed.

CORN YIELDS AND TOPSOIL.—Corn yields are reduced by 5 bushels per acre for each inch of topsoil lost, reports Orville E. Hays, SCS research, LaCrosse, Wis. Erosion is reduced 75 percent by strip cropping and 85 percent by terracing. Corn yields increased by at least 10 percent by strip cropping and terracing as a result of increased moisture and improved stand.

FRONT COVER.—A contour strip of nursery stock 100 feet wide on the D. Hill Nursery, Dundee, Ill. The sod strip to the right is in brome-alfalfa. "The commercial nursery business of the United States is big business," as Harry A. Gunning remarked in an article in the August issue. And it has found out that it pays to conserve the soil which is its chief asset.

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STEALING A MARCH ON WIND EROSION

By H. H. FINNELL

WIND EROSION IS TRICKY. And if you aim to overcome it you had better meet it on a ground of your own choosing. This has recent proof out of some studies of land use experience in the old dust bowl.

Back in the 1930's where Colorado, Kansas, and Oklahoma join was the starting place of many of the big dusters. Acting on the theory that there ought to be a lesson in what has happened since then on the lands of this area, we took a second look in 1947.

The first extensive conservation survey was made there in 1936 by Arthur H. Joel and party. Five thousand square miles of selected sample areas have now been resurveyed.

IN ELEVEN YEARS, land use changes were expected and many were found. They were due both to the urge for war production and to land deterioration through severe erosion damages. But farmers are a practical-minded lot. On the whole they have not attempted impossible feats of reclaiming and reconditioning the abandoned lands. The least damaged of the better class land was wisely selected to be brought back into cultivation.

Now, if this same good judgment used in the matter of restoration were applied likewise to the choice of new lands to cultivate, the battle for permanent control of storm dust in the Great Plains would be over.

The one important act of choosing a land use within the capability of the soil outweighs any erosion control practice or combination of them as applied to the marginal lands of the Great Plains. On particular soils it is the No. 1 control practice.

It is simple to set out boundaries between arid and semiarid climatic belts, between brown and light brown soil belts, between old established dry farming areas and the newer ones. But the soils are not blocked off that way. No general divisions of the wind hazard territory can serve as a guide to proper land use decisions. Good, bad, and indifferent soil groups are intermingled athwart any area boundary you can devise.

Therefore, we are forced to fall back on the specific physical descriptions of soils if we want an infallible basis of discrimination under any given climatic condition. Up to now we do not have a better land use guide than the actual recorded performance of different soils under identical climatic and use conditions.

Our recent investigations in the wind erosion areas show that they do behave differently. For example, the deep, nearly level, heavy-textured wheat soils were not damaged to exceed 2 percent by wind erosion severe enough to cause abandonment. Medium depth soils of the same kind were so damaged up to 24 percent of the tilled acreage, shallow soils up to 41 percent.

In further contrast, the shallow, moderately-sandy soils of gently rolling topography suffered those extreme damages in several counties on more than 69 percent of the plowed acreage. These percentages represent the extent to which different lands were decisively put out of business by erosion in a short time. They were idle throughout the war period and still remain abandoned.

On the other hand, many thousands of acres of the better and only slightly damaged lands which were abandoned due to financial distress have come back into cultivation with comparative ease. We call them high capability lands. They *are* high capability lands. If we had to meet the problem of wind erosion only on these choice lands it would be easy.

With conservation skill, wind erosion can be successfully met and overcome on lands of low capability for cultivation. But on soils which have proved themselves over and over to have no capability for sustained cultivation it is a hopeless struggle bound to end in failure. We might call them the "one-shot" lands.

Ordinarily, the acceptance of proper land use has been thought of as a desirable step for starting

Note.—The author is research specialist, Soil Conservation Service, Amarillo, Tex.

on a conservation program. In the case of marginal lands of no capability for cultivated crops, the land use decision becomes the most critical step in the program. The consequences of a wrong decision are too drastic and irrevocable.

This thing of destructive land use has become a widespread problem along the borderlands of transition from semiarid to arid climate. The fact must be accepted that low grade lands can be cashed in under certain conditions. To wear the new off these "one-shot" lands has been found to be profitable while prices are high. The cruel joker in this plan is that the new wears off quickly. When a landowner decides to take his one shot, the brief period of profits is soon past. It does leave the land "shot."

The capacity to grow the good grass it once had has disappeared. Long periods of complete idleness generally follow the abandonment of cultivation. The effect is the same as swapping off the long-sustained usefulness of the land for growing grass to take instead a quick but final profit on its ownership.

According to the records of the 1930's three-fifths of all the storm dust that plagued the southern plains came from low grade lands which were in the process of their final breakdown leading to discard. At least this much of the dust of any future storm threats could be stopped before it started if only the lessons of past experience were heeded.

DISTRICT PROFILE

DENNIS GETCHELL

Maine Man

IF YOU HAVE traveled northward into Maine on the Bangor and Aroostock Railroad, chances are you have sampled one of the products of Dennis Getchell's farm in the town of Limestone. For Dennis Getchell has been supplying the railroad's diners with selected baker potatoes for several years.

Getchell, chairman of the Central Aroostook Soil Conservation District, president of the State Association of Soil Conservation Districts, and a director of the National Association of Soil Conservation Districts, grows about 75 acres of po-

Getchell explains his conservation program to group of Canadian farmers.

tatoes each year. To add an international flavor, he grows 10 acres of seed potatoes in New Brunswick. But he has a lot of other interests, too, and these interests are shared by his wife, Lula.

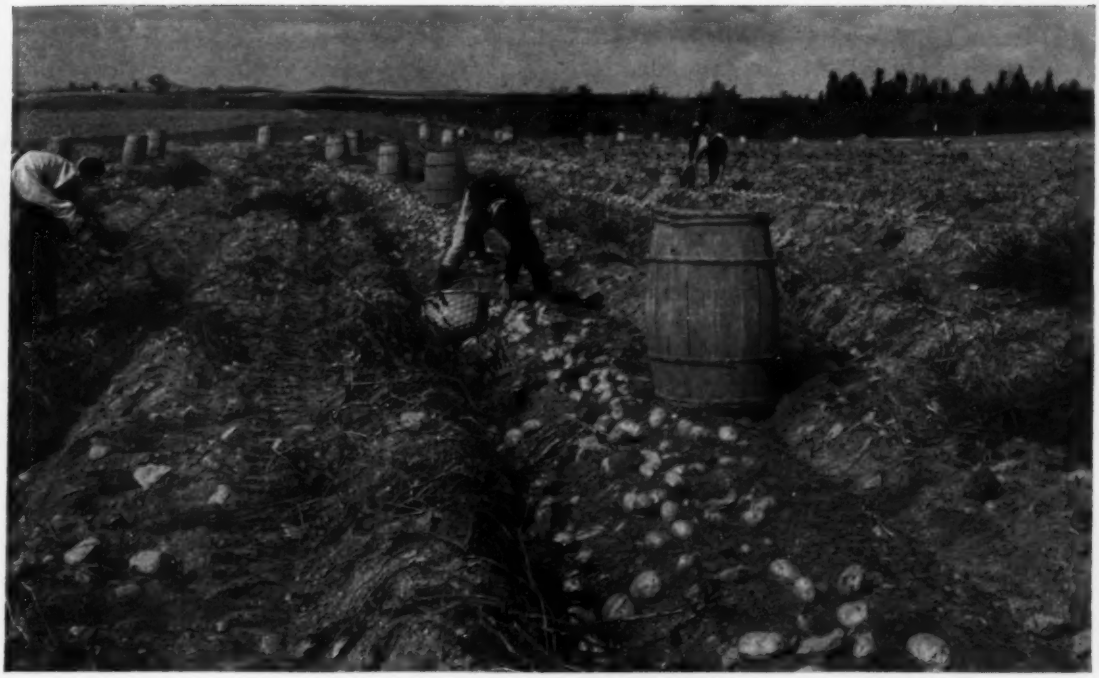
Potatoes now share the spotlight with a herd of purebred polled Herefords, which has been a-building for several years. The Getchells augmented their herd last winter by purchasing a

Dennis F. Getchell.

quantity of calves in the course of an extended automobile trip.

The Herefords came into the farm enterprise for three reasons. For one, new pastures were developed on lands subject to severe erosion if cropped. "Secondly," Mr. Getchell said, "I love animals and wanted livestock on the farm; and, thirdly, although I probably should list this first, Lula had always wanted a herd of Herefords."

Fishing is another Getchell family interest. The farm purchased in New Brunswick, to grow seed potatoes in an isolated area free from disease, carried with it fishing rights on about a half mile of the Tobique River. The Getchells have built



Harvesting potatoes on the Getchell farm.

a camp on the banks of the river. Here they spend most week ends during the season, fishing for Atlantic salmon. Anyone lucky enough to be invited up for a week end is in for a treat.

In addition to his farming, soil conservation, and fishing interests, Getchel is director of the Bangor and Aroostook Railroad, Northern Telegraph Co. and Van Buren Bridge Co., and treasurer and manager of the Aroostook Potato Co., a firm that raises 100 acres of potatoes and does a shipping business.

Getchell's interest in soil conservation is not only national, but international. On several occasions, during the past 3 years, he has been host to Canadian agricultural workers at his home farm. His guests are shown conservation work on the land, told how soil conservation practices are improving Aroostook agriculture.

At national meetings, Getchell likes to tease western soil conservationists about the size of sprawling Aroostook County (4,190,000 acres) "so big we had to carve it up into three soil conservation districts." And he is never out-talked by fellow potato growers from the Northwest when comparative size, yield, quality, and price are up for friendly joshing.

The Getchell home farm, developed by the father and grandfather of the present owner, includes diversion terraces, sod waterways, strip cropping, rotations and retirement of steep land to pasture in its conservation program. Getchell started conservation farming in 1940 when he became alarmed at developing gullies, and thin spots on the knolls. As a result of his experience he is today an outstanding local, State, and national conservation leader.

—William B. Oliver

FERTILIZER EFFECTIVENESS.—Fertilized, uneroded soil produced 1.5 tons more sweet corn per acre than fertilized eroded soil at Geneva, N. Y., according to John Lamb, Jr., SCS research. Fertilized uneroded soil produced 16.7 tons of cabbage per acre compared with 13.8 tons for fertilized eroded soil. The soils and fertilizer treatment were the same with each crop, the only difference being that the eroded soil had lost most of the topsoil, whereas the uneroded soil retained most of its topsoil.

USE MORE BROMEGRASS.—One acre of good bromegrass pasture will feed as much livestock as 1½ to 2 acres of bluegrass pasture, finds Maurice E. Heath, SCS Nursery Division, Ames, Iowa. Bromegrass makes a real contribution toward our effort for maximum food production and in making our land produce at maximum capacity.

FRANK BIRD— *Soil Conservationist*

By R. Y. BAILEY

Bird standing in field of Caley peas that will be harvested for seed as one of his cash crops. Kobe lespedeza following the peas will add still more plant manure to the soil.

NESTLED IN THE HILLS of north Georgia, the farm of Frank Bird is a fine example of the proper use and treatment of land. This small farm has only 20 acres of cultivated land, yet Bird is supporting his family and making the land better.

Bird spent many years as a school teacher in Georgia and California. He bought his 113-acre farm 12 years ago and worked out a farm plan with the Limestone Valley Soil Conservation District in 1940.

To me, the most interesting thing about the Bird farm is the fact that on a small acreage of cropland he follows rotations that meet the requirements set forth in land capability tables. Most of his cultivated land is in capability Classes II and III and is being well protected by rotations that fit the land.

The rotations are interesting because they are almost automatic. Four years ago Bird sowed wild winter peas (*Lathyrus hirsutus*) on all his cultivated land, and since then this legume has volunteered each fall.

When I visited his farm near the middle of May, Bird said, "I planted peas 4 years ago and they are still coming up. They get thicker every year." He harvests seed for sale, but does not need any for use on his own land. He sows small grain for winter grazing or for grain, and seeds Kobe lespedeza on the grain and volunteer peas in the spring. This gives him a winter cover of small grain and volunteer peas and a summer cover of lespedeza.

Class II land is cultivated every other year and Class III land every third year. The ground is under protective cover the rest of the time. This rotation system requires a minimum of soil disturbance because the winter peas volunteer and the summer lespedeza cover makes seed the first year and volunteers the second year. When small grain is planted, it usually is drilled early in the fall before volunteer peas come up.

Land preparation for row crops is an important part of the conservation program on the Bird farm. He does not flat break his land. He beds his rows when legumes are ready to be plowed under. This operation covers the green peas in the beds so that they will decay, and leaves the land in a system of contour beds that greatly reduce runoff.

After the first beds have lain for a few days, fertilizer for cotton is applied in the furrows where the balks between the beds are plowed out and the land is rebedded. This second bedding operation brings back to the surface a considerable part of the plant material that was plowed into the

Note.—The author is chief, regional agronomy division, Soil Conservation Service, Spartanburg, S. C.

first beds. The material thus uncovered functions as a partial mulch and further reduces erosion.

The soil, Clarksville gravelly silty loam, has so much organic material in it that it has a "live" feel underfoot instead of the hard, crusty condition that usually is characteristic of such land.

Bird does not have terraces on some of his Class III land. He does all plowing on the contour, always keeping a contour-bed effect, and leaves buffer strips of unplowed vegetation at intervals on the slope. When asked about these strips he said, "They are not any definite width nor spacing. I just leave a few rows unplowed occasionally. I don't have much runoff and can't be losing much soil."

An important factor in the Bird system is that his contour bedding keeps his soil in place. He does not develop benches around field borders as so often happens where flat breaking is practiced.

Crop yields are increasing under this simple but effective cropping system. Land on which farmers in this section of Georgia often get less than 10 bushels of corn or about a quarter of a bale of cotton per acre from is making a bale and a half of cotton or 50 to 60 bushels of corn per acre. One field on which Bird produced about a bale and a half per acre in 1947 produced about a quarter bale per acre 12 years ago. At that time this land produced about 8 bushels of corn per acre.

Bird says his yields are still increasing and that he expects 2 bales of cotton per acre in 1948. He is a strong believer in soil conservation and says, "Farmers must cooperate with nature by putting enough organic matter into the soil to store water and to build up its fertility."

In addition to his 20 acres of rotated cropland, Bird has 6 acres of perennial hay (kudzu and sericea), 5 acres planned for orchard and vineyards, 8 acres in improved pasture, 72 acres of protected woodland and 2 acres in miscellaneous use. The planning service he received from the Soil Conservation Service through his district helped him to get better land use and a simple crop rotation that fits his conditions of small acreage and limited farm machinery.

Bird appreciates the value of woodland. He planted 3 acres of pine trees in 1940. All of his woodland is protected from fire. He is building a new home with timber cut from his own woods. Only the roofing was purchased. He built his own bedroom furniture, using home-grown timber.

His farm serves as a community demonstration of what can be done with land through intelligent use and treatment, but Frank Bird has made other contributions to public welfare. During the recent war, he sent five sons to the armed forces and his two daughters were employed at Robbins Field, Macon, Ga., where they did their share toward the prosecution of the war. The youngest son, who was too young to be away from home, assisted with the farm work while not in school.

Livestock is not a very important part of the income of the Bird farm, only three milk cows and two mules being kept. Two acres of cornfield beans planted each year make up a portion of the farm income. Beans are sold fresh and the surplus is canned on the farm. Last year, 1,500 cans of beans were sold in Dalton.

Sericea lespedeza is one of the two deep-rooted perennial legumes used for hay on the Bird farm. Sericea shown here protects a waterway.

When the Georgia Bankers Association selected farmers to receive their award for meritorious service in soil conservation, Frank Bird was among those selected from Whitfield County. The outstanding pioneer job he is doing is showing the way for others who have small farms, and amply qualified him for this honor. He has shown that even on a small farm land will pay for good treatment. His rotation includes enough ground cover, both winter and summer, to protect the land from erosion and to supply a sufficient tonnage of plant manure to the soil to make it rich. If his rotation is continued a few more years, his entire 20 acres of cropland will be as rich as a vegetable garden.

The theory that farmers who have small acreages do not have enough land on which to practice soil-conserving rotations is disproved here. The Bird family is producing 6 to 7 bales of cotton, 200 to 225 bushels of corn, 8 to 10 tons of hay, a considerable amount of winter grazing, legume seed for sale, and both fresh and canned beans are sold each year. Farms of this size where all cropland is cultivated each year because farmers think there is not enough land on which to follow good rotation practices already are producing less than the Bird farm. Furthermore, the Bird farm is increasing in productive capacity, whereas other farms where land is being abused produce progressively less from year to year.

The man, Frank Bird, is an interesting personality. He has that look out of his eyes that belongs to those who can see far ahead. He has a love for good land that is based on intelligent understanding of what the soil needs and how it will respond when these needs are supplied.

MECHANICAL TREE PLANTER.—Four million trees were planted with 16 mechanical tree planters during the spring of 1944, relate H. D. Bruhn and F. B. Trenk, Wisconsin Agricultural Experiment Station, Madison, Wis. The planting unit is built around a simple-bottom, triangle-type tractor plow. The advent of the tree-planting machine has developed definite and favorable trends in forest development. These trends embrace all classes of forest owners.

Caley peas were turned under here in preparation for cotton by bedding on contour. Balks will be plowed out, fertilizer for cotton will be applied in the furrows, and the land will be rebedded. Buffer strips of peas were left for added protection.

A Meeting Place for Brave Ideas

By Wellington Brink

Brave ideas and great heart go with all true pioneering. It was so at the clearing of the wilderness, and it is so at the new frontiers of science. So long as our people undertake to think with courage and with conscience, to step forth briskly along the paths of high adventure, there is room for cheer.

Today many minds and many wills are at work for the salvation of the human race. Never in history has there been so determined an assault upon the vast Unknown. Never has there been so great a challenge nor so much at stake. The peoples of the world must be fed and housed and clothed. There must be good ground under their feet, good food on their tables, good blue skies of peace and hope above their heads. We are beginning to move toward these ends, one step at a time. Already there is progress in soil conservation beyond anything previously achieved since the Garden of Eden. There is spectacular advancement in nuclear physics, in organic chemistry, in animal breeding and plant biology, in industrial management and political science. There is hardly a field vital to home and family untouched by the awakening of our times.

At Ohio University each year there is a Conference on Conservation, Nutrition and Health. It is a meeting place for the brave ideas and great heart of which I speak, and it is fathered by Friends of the Land.

This year's conference on June 26–27 followed the unique pattern of its predecessors. It brought together for the seventh successive year the newest techniques affecting the ecology of man and his environment. Again, as heretofore, it joined science, profession and philosophy in common cause against malnutrition, waste, and want. Once more, it supplied a common denominator for research workers and social missionaries.

The Conference was important for honored names and timely topics: Dr. Frank Boudreau, of the Millbank Foundation, speaking on "The World's Food Supply"; Vincent Sauchelli, chairman of the fertilizer division of the American Chemical Society, talking about "Atomic Energy: Its Uses in Agriculture and Agricultural Research"; Dr. Clive Maine McCay, of Cornell University, discussing "Diet As a Factor in Aging"; Dr. Saul Boyk, of Purdue University, arguing the case for the utilization of valuable materials from municipal garbage and sewage —to cite but a few of the distinguished speakers and their themes. Short quotations from a few of the papers appear in this issue of Soil Conservation Magazine.

Even more important than the program was the audience: men and women who are leaders in their communities, officers of large corporations, farmers, scientists, educators, writers, students. They came from as far away as New England and California, for the fame of the conference is spreading. They asked questions, tied ends together, made major contributions to the fresh viewpoint on soil-health relationships.

One of the fine things about these annual Conferences is their testimony that Friends of the Land is capable of *doing* things.

First of all, the Friends have succeeded in directing the attention of the Nation to the pressure of the land problem. In so doing, they have drawn to their educational program the support of a large segment of the public press and civic leadership. Second, they have given to our country a distinctive and ably edited quarterly magazine, *The Land*, which brings the feel of the good earth to city man and country man alike. Third, the Friends have devised this extraordinary

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annual Conference on Conservation, Nutrition, and Health which has gone beyond the early expectations in publicizing widely varied scientific studies of application to a common problem. If the Friends had done nothing more than this, they would have justified their existence as a conservation organization.

We can look forward to additional good works by Friends of the Land. For the Friends are as young as the land is old, and they bring with them brave ideas, love of fellow man, and the courage to explore.

QUALITY CONTROL IN TIMBER CROPS

"We shall have to harvest our trees in the future at a much younger age," Dr. Benson H. Paul, senior silviculturist of the U. S. Forest Products Laboratory, Milwaukee, told the seventh annual Conference on Conservation, Nutrition, and Health.

"The high quality timber we have been using represents the outer 200 years' growth, or more, of trees that are from 300 to 400 years old. Future lumber will have to be produced in stands less than 100 years old. To do this, foresters will have to supervise our planting and care of future timber crops. Experts will have to regulate the initial stocking, see that lateral branches are pruned from trees when they are very young, and take every step necessary to grow the trees at a uniform rate. Crop trees of only the best form must be selected, and these must be planted in sites that are best adapted to the given species."

WE ARE WHAT WE EAT

"Our health depends upon a sound and abundant agriculture producing foods of the best possible quality. Perfect health comes not from the medicines of the physician, but rather depends upon a sound nutrition," Dr. Jonathan Forman, editor of The Ohio State Medical Journal, told the seventh annual Conference on Conservation, Nutrition, and Health, sponsored by Friends of the Land at Ohio University.

"Good nutrition, in turn, depends upon three factors: Good food, good digestion, and good muscular tone. But the greatest of these is good food. To maintain the quality of our food demands that we harvest, process, prepare, and serve it without destroying any of the elements that are essential to our nourishment, and that we eat a sufficient variety to insure that we get all of the factors that our bodies need. Nevertheless, all of these things may have been attended to and yet our diet may be inadequate because the soils upon which our foods were grown did not have the essential elements in them.

"A hungry, under-nourished people are half-sick people, physically, mentally, and spiritually. They are the real menace to our Republic. Through their apathy, their ignorance, their lack of intelligence, their deficient social judgement, their sexual immaturity, and their emotional instability, they fall prey to their psychopathic compatriots who can easily lead them into revolution or into war for their own selfish ends."

WORLD FOOD SUPPLY

"Since the beginning of the industrial revolution, no war, including World War II, has ever succeeded in stopping the increase of the world's population," Frank Boudreau, M. D., executive director, Millbank Memorial Fund and chairman of the Food and Nutrition Board of The National Research Council, told the Conference on Conservation, Nutrition, and Health.

"In areas containing over half of the world's population the food supply before the last war was only enough to give an emergency subsistence diet as defined by the National Research Council. Of course, in such areas a small proportion of the people obtained more than the average and a large proportion obtained less. It is no wonder,

then, that high mortality, short lives, civil disorders, apathy, depression, and irritability are characteristic of the peoples of these areas in which half the world's human family exists. Another one-sixth of the world's population exists on the border line of hunger.

"Most fortunate are the world's people who live in areas where food supplies are sufficient to furnish an average intake of 2,500 calories per person per day."

Dr. Boudreau concluded that none of the difficulties in which the world is plunged today is beyond the genius of mankind to solve. "The intelligence that has brought our world to its present level of technological and cultural development is fully capable of mastering hunger, disease, and war. A good start toward world peace and plenty will have been made when our leaders turn from dealing with the symptoms of the neuroses that affect mankind to the satisfaction of man's fundamental needs of which the need for food comes first."

SOILS THAT MAKE CHAMPIONS

B. T. Abbott of the Southern Soils Service, Memphis, Tenn., told his audience at the Conference on Conservation, Nutrition, and Health the story of how he was able to win a score or more blue ribbons with his white-faced cattle the fourth year he had been using them to restore abandoned cotton land.

This soil expert insisted that soils can be, in many instances, rebuilt and that much of the talk about submarginal lands is in reality submarginal thinking. Farmers need to know more about the role that minor minerals play in soil fertility, and they need to know it now, Abbott pointed out. Like farm experts everywhere, he insisted that the greatest crop for the South in the future will be grass. More grass means clear water in the streams, more organic matter in soil, improved bacterial action, better water retention, and a better way of life for all concerned.

ATOMIC ENERGY: ITS USES IN AGRICULTURE

Tagged atoms, called radioisotopes, are now being produced in an abundance and at low cost for scientific research purposes by the Atomic Energy Commission at its Oak Ridge plant, explained Dr. Vincent Sauchelli, Chairman of the Fertilizer Division of the American Chemical Society, Baltimore, Md., at the Conference on Conservation, Nutrition and Health.

"Reaction piles give agricultural scientists powerful new tools with which to probe into the secrets of Nature. New techniques are being developed which employ these radioisotopes to trace the behavior of individual molecules and atoms throughout complex chemical reactions in the soil, in the plant, and in the animal or human body.

"The Bureau of Plant Industry at Beltsville is studying the influence of radioactive materials on the germination of seeds and the growth of crop plants."

CAN FOOD KEEP THE PEACE?

"It is possible to give 3,000,000,000 people an excellent diet at a cost that all can afford," Dr. C. F. Schnabel, nutrition chemist of Kansas City, told the seventh annual Conference on Conservation, Nutrition, and Health.

His plan is to use grasses of the highest protein content which, if properly handled at just the right time, may be the answer to the almost unlimited growth of our population. A method for taking the important food elements out of grass has been worked out by Dr. Schnabel. This process separates the elements from the grasses into four parts, viz: (1) fiber which has enough good food value left in it to be returned to the farmer for cattle feed; (2) a water-soluble fraction

containing the water-soluble vitamins and the minerals; (3) a fat-soluble fraction containing all the fat and fat-soluble vitamins; (4) a portion which is about 60 percent protein.

With this method, says Dr. Schnabel, it would take only a few farmers to feed thousands of people. A complete day's ration could be produced for 16 cents and at a return of $2,100 per acre.

CONSERVATION, SECURITY AND SURVIVAL

"Freedom from want is the aim of all people. Civilizations are largely based on the ability to secure food. The fertile lands of the world are occupied and man must work out his security and salvation on the land which he now holds. Conservation, security and survival will probably be one and the same," Ollie E. Fink, executive secretary of Friends of the Land, told the Conference on Conservation, Nutrition, and Health.

"One of the principal objectives of the Friends of the Land is to inform citizens of town and country—that in the final analysis, conservation is more important to the man who lives in the city, than it is to the man who lives on the farm. We explain it this way—in pioneer days, 19 people worked on the soil to produce enough food and fiber for 20 people; one was free to live in the city. Seventy-five years ago, 8 farmers with their new steel plow were able to provide for 10 people; 2 people lived in the cities.

"Then came the inventors who made the modern city possible. One farmer today with his tractor, his combine, and other 'mechanical slaves' provides for four of us. The farmer eats first—and farm production beyond the needs of the farmer and his family is surplus. It is the surplus which makes life in the city possible. If there is no farm surplus, there is no city. The farmer may long exist after the city man starves. Without conservation, fields formerly fertile are now unproductive, and so it is only through conserving the soil today that we provide the surplus which enables cities to continue to exist. Therefore, conservation is of greater importance to those who live in cities than it is to those who live on the farms."

HEREDITY AND SOIL

"Today in the United States our replacement population is coming increasingly from those areas in which the over-all situation is least satisfactory in terms of our vaunted American standards of living," Robert Cook, Washington editor of the Journal of Heredity, told the Conference on Conservation, Nutrition, and Health. "Our next generation is going to be recruited from the Class IV, V, and VI land areas. We are breeding, therefore, for a type which will survive under submarginal conditions. And in the lush areas we are not raising an increased percentage of people.

"If we come realistically to grips with the problem of quality and quantity population in such terms, we can begin to deal realistically with plans to create the champions that are to occupy our champion-building soil. The future of our human race is on the farm and not in the city. And what happens to our farming population as it responds to environmental changes will determine our future."

For the first time in the history of the Conference, all proceedings will be brought together and made available in book form. The introduction will be by Louis Bromfield. Copies may be purchased from Friends of the Land, Columbus 1, Ohio.

Leaders in soil conservation project of Young Citizens' Leagues. Front row: E. C. Opliger, Miss Julia Haehner, Miss Lillian H. Schafer, I. J. Bibby, Mrs. Doris Broadwine, Miss Jule Ensteness. Back row: Ross D. Davies, Miss Marjorie Leesch, J. F. Hines, C. I. Krumm.

THEY LEARNED ABOUT THE LAND IN A BIG, BIG WAY

By LILLIAN H. SCHAFER

Supervisor of Elementary Education
South Dakota Department of Public Instruction

SOMETHING over 30,000 South Dakota rural school children in all grades know a lot more about soil and water conservation today than they did a year ago.

Even so, more than one county superintendent of schools still wonders whether the teachers or the pupils learned most. Not that the youngsters didn't learn plenty. But the teachers had to get the information about conservation and how to teach it in order to carry on.

In any event, there is no doubt that the understanding of South Dakota's soil and water resources and the need for conserving them is much more widely understood than ever before, because the children themselves wished it so.

This all began in May 1947 when the delegates at the South Dakota Young Citizens' Leagues convention at Pierre voted to adopt soil conservation as the major project for the 1947–48 school year. *Their action gave the State the most widespread, concerted effort at conservation education in the northwest. Possibly in the whole Nation.*

Just how extensive it was can be judged by the character of the Young Citizens' Leagues. Each rural school has a chapter. Altogether, there are 3,650 chapters in the State, with 38,650 members. Their purpose is to acquaint the children with civic functions and problems, so that they will be better

prepared to be useful citizens. The children themselves, through their elected delegates to the State convention, select the activities they engage in on a State-wide basis. The teachers help them carry out the projects as part of the regular school courses.

Soil conservation was proposed as the project by Beverly Aadland, a delegate from Day County, where E. C. Opliger is county superintendent. The Day County delegates had behind them the experience of 6 years during which the schools in that county had made use of a 6-week conservation unit in their science courses. Miss Aadland presented the project well, and it received more votes than the other three proposed projects combined.

During the year that followed, fully three-fourths of the chapters of the League actively participated in the conservation course of study. They took tours to observe conservation practices and erosion problems. They prepared exhibits—scrapbooks, posters, soil maps and profiles, model farms, farm lay-outs, grass herbariums and essays—for county, circuit, and state-wide contests.

"Its effects are far more widespread than most people realize now," Mr. Opliger said this spring about the project. "I believe, for one thing, that it has done more to make the public appreciate the worth of the Young Citizens' Leagues than any other project they have undertaken."

Further than that, it was a project of such widespread interest that it brought more people into contact with the Young Citizens' Leagues than any previous project. The Greater South Dakota Association supplied funds for circuit and State awards. Soil conservation district boards of supervisors, several Kiwanis clubs, and an Izaak Walton League chapter supplied county awards. Soil Conservation Service personnel, county agents and Extension Service specialists helped the school authorities organize the project, gather materials, provide reference information, orient teachers, and outline activities. The State Fish and Game Commission bought booklets for use by the schools. Farmers guided pupils and teachers on visits to their farms, where they studied the application of conservation.

As executive secretary of the Young Citizens' Leagues, it was my job to start the project on its way. The State Superintendent of Public Instruction, as State Y. C. L. chairman, appointed a committee of three county superintendents, who bore the brunt of working out the organization of the project, getting the necessary aids and materials, and in general "spark plugging" the whole program. This committee consisted of E. C. Opliger of Day County, Miss Margaret Long of Beadle County, and Mrs. Ellen Scheel of Stanley County.

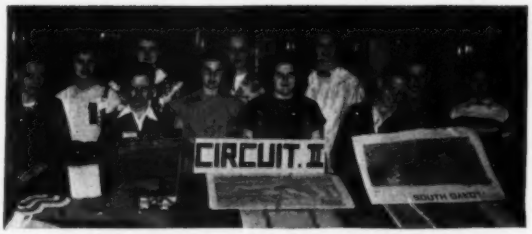
Together with Soil Conservation Service employees, Extension Service specialists, members of the State Department of Public Education and others, the committee worked out the program by late June last year. It outlined the conservation education activities considered suited for grade school children, such as building models, essays and poster contests, drawings, scrapbooks, and so on.

This committee also made arrangements for the necessary competition in the various activities. The State was divided into 6 circuits of from 11 to 13 counties each, with a county superintendent as chairman for each circuit. In each county, the competition was between schools. The best scrapbook model, essay, poster or other exhibit item from each county competed in its circuit contest. And the best item from each circuit made up the circuit's exhibit for the State title at the annual convention at Pierre May 3 and 4 this year.

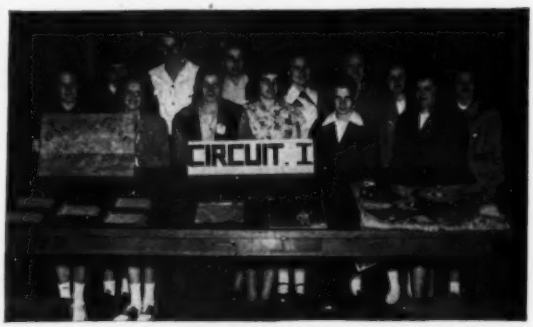
County superintendents discussed the project at their annual meeting at Deadwood in June 1947. At that time, a display of conservation information materials that had been assembled by the Soil Conservation Service was exhibited, and each superintendent was given a packet of such materials. In turn, the county superintendents outlined the program to the teachers at their institutes just before school opened.

Some of the institutes devoted a full day to the conservation project, others gave only half a day to it. They all followed the same general pattern, however. This was an explanation of the fundamentals of soil and water conservation and of various devices that can be used to teach them to the children. Usually both the county agent and the local Soil Conservation Service employee took part. The extension soil conservationist also aided with some of the institutes.

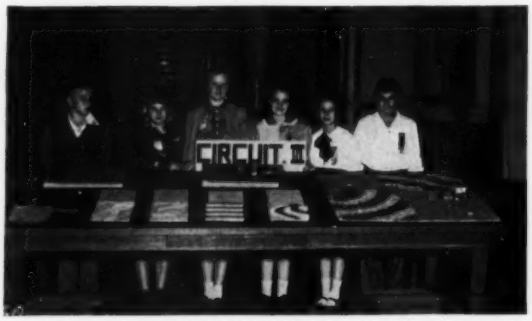
When a full day was devoted to conservation, the preparation of the teachers was naturally more thorough. One of the best examples of this came in the report from Hand County. There, the basic information was given in the morning. In the afternoon, the teachers went to the field. They were taken to a farm where a complete conserva-



Winner was Circuit II, representing schools in Brookings, Lincoln, Turner, and Yankton Counties.



Part of exhibit by Circuit I, second in competition at Young Citizens' Leagues state convention. Counties represented: Roberts, Grant, Clark, Brown, and Day.



Circuit III was third-place winner. Counties represented: Beadle, Hansen, and Brule.

tion plan had been worked out. They were shown the map of the farm, while the meaning of land capabilities was explained as were the reasons for adopting the conservation practices that had been and are being applied. They saw how the plan was being carried out on the land. It is reported that, far from worrying about getting their shoes dirty trudging over the fields, these teachers were eager for more such information.

The county superintendents generally followed through with help to the teachers. For example, Mr. Opliger reported that as each school in Day County was entered in one or more project activities, each pupil received a button that proclaimed that he was participating. He said, too, that letters were written to all farmers cooperating with the Day County Soil Conservation District, asking them to help the children with the project. The result, he said, was that the teachers received unusually fine cooperation when they took the pupils to the field.

Mrs. Bert L. Hall, county superintendent for Brule County, had "one up" on most of the county superintendents. Her husband is an employee of the Soil Conservation Service, actively engaged in helping farmers conserve soil and water.

"I've been exposed to conservation education for a long time," Mrs. Hall remarked. "It was only natural that I should become interested. As a result of my past experiences, I was able to suggest field trips the teachers might arrange, suggest outlines for essays, and provide lists of conservation materials that also told where to get them."

The State Department of Public Instruction included suggestions for the project in its news service for county superintendents, issued every 6 weeks. And the 67 county superintendents included teaching suggestions and reference material in their news service, also issued every 6 weeks.

There are some fine examples of individual accomplishments in teaching, too. One is reported by Miss Norma Koehne, county superintendent of schools for Kingsbury County. It concerns the Little Rock school, which spent much of its project time gathering material for a large, attractive conservation scrapbook. Fine as it was, however, it didn't quite get to the final contest at Pierre.

"The whole community took part in the project," Miss Koehne said. "Parents seemed as much interested as the children. The scrapbook contains pictures of these parents, together with their statements about conservation.

"It also contains autographed pictures and letters complimenting the school on the Leagues' conservation project from the Governors of North and South Dakota, Montana, Wyoming, Nebraska, Minnesota and Iowa. The children got these pictures and letters on their own initiative.

"This is a county where the soil conservation district had been organized only last fall. Work on the school's conservation project was also an education to the parents."

Among the superintendents interviewed about their experiences, there was about an even division among those who favored handling soil conserva-

tion as part of the children's science course and those who favored making it a part of as many subjects as possible. It seemed to me, however, that there was more enthusiasm about the latter.

As I mentioned earlier, the Day County schools have been using a 6-week unit for the last 6 years. There, the teachers have been able to get a firmer grasp on the subject as the result of the experience. As Mr. Opliger put it, the conservation project was just taken in stride in Day County since it already was part of the school's program.

Mrs. Scheel expressed the opinion that handling the project along with all the other subjects gave the children an opportunity for self-expression. It was made part of the English course.

"When it is handled this way," she said, "it enables the pupil to see the relation of his school subjects to the everyday practical things of life. We had good success with getting the older children to read bulletins and report on them orally as part of their public speaking."

Miss Genevieve Arntz, county superintendent for Brown County, is of the opinion that "if conservation is taught as a unit, it is studied intensively for a short period and then forgotten. But if you start in fall and bring it into everything that is taught, you maintain interest through the year.

"The children loved it. It gave them an understanding of the life around them and of land-use problems in the county."

Soil conservation is so large a subject and the time for preparation was so short that it was only natural that there was a good deal of variation in the accomplishments of the schools. Generally, teachers were unprepared for teaching conservation. They had little idea of what it is or where to get the information. Not all of them had the imagination to apply the information they were given to the surroundings. As an example, one superintendent remarked that it was too bad that the project had not included forest conservation. She had not seen that in her territory forest conservation is a prime soil conservation measure—that keeping the forests thrifty provides the necessary cover to control runoff and check erosion.

Superintendents agreed that two things are needed. One is training teachers in the techniques of teaching soil conservation, the same as they are taught how to teach the other sciences, English, or geography. The second is the need for more teaching materials and aids on soil conservation. The Soil Conservation Service, Extension Service, and the State College were of great help, supplying information on the availability of materials and even supplying some of the actual materials themselves. But the lament over the shortages of such teaching aids was general.

So you can see that carrying out so widespread a project was not without its problems. The results, however, were well worth the effort. Where, at the start, the teachers were dismayed over the prospects, they have become interested and there was strong sentiment for continuing conservation education. Many expressed their belief that conservation should have a larger place in schools.

As for the youngsters? The delegates at this year's convention voted to continue the conservation project. This time it must be labeled "minor," since the Leagues' constitution provides that a new major project shall be selected each year. Nevertheless, it caught the imagination of both teachers and pupils well enough in the past year to assure that conservation education will receive more attention than it ever did in the past. It definitely is part of the process of preparing the youngsters to be useful citizens.

1948 GOLD MEDALIST.—The 1948 John Deere Gold Medal has been awarded by the American Society of Agricultural Engineers to Dalton Giles Miller. For nearly 4 decades Mr. Miller served continuously in the Department of Agriculture, until his transfer in 1946 to the Public Roads Administration. He started work in the Department with the Division of Irrigation and Drainage, following its organizational migrations from the Office of Experiment Stations, through the Bureau of Public Roads, of Agricultural Engineering and its successor alignments, to the Soil Conservation Service. He became a national authority on various phases of drainage.

GRASS TOPS ALL USES.—Grass provides a larger source of revenue to Texas ranchers and farmers than does any other land use within the State, avers W. M. Nixon, SCS, Fort Worth, Texas. Grass, moreover, when properly managed, is a major factor in conserving soil and moisture and in maintaining and increasing the productivity of the soil.

Native pastures throughout Texas do not provide year-round green forage. In order to have nutritious, palatable grazing throughout the year, supplemental grazing crops are often used. Fortunately, most of the best adapted supplemental grazing and feeding crops are also soil-conserving and soil-improving crops.

COLORADO'S GREAT "WEEK"

By VIRGIL S. BECK

COLORADO ALREADY is shaping up plans for its third annual Soil and Water Conservation Week scheduled for next February. The week will be held in conjunction with the annual meeting of the National Association of Soil Conservation Districts in Denver.

The success of the second annual observance in Colorado, February 15 to 22, can be attributed to careful advance planning, the full cooperation of all agencies concerned, and a lot of hard work.

The Colorado USDA Council was designated as the sponsoring organization. Kenneth W. Chalmers, SCS State conservationist, and Charles Terrell, acting extension conservationist, were named co-chairmen. Committees and subcommittees were set up to handle press, radio, exhibits, speakers, education, and so on. Thousands of letters inviting participation in the observance were sent to business organizations, schools, civic groups, and others, and many personal contacts were made by committee members.

A month ahead of the Week, spot news stories, often with pictures or mats, began going to all Colorado daily and weekly newspapers. Farm publications serving the State featured soil and water conservation articles. Most radio stations carried daily announcements, and several business firms used enclosed "stuffers" in their letters circulated to promote interest.

Note.—The author is head of current information section, Soil Conservation Service, Albuerque, N. Mex.

Kent Leavitt, president of National Association of Soil Conservation Districts, speaks at Denver meeting. Denver will be host to the National Association in February.

Walter A. Groom, president of Colorado Association of Soil Conservation Districts, addresses annual meeting.

The Week's observance was highlighted by the 2-day annual meeting of the Colorado Association of Soil Conservation Districts in Denver, with 150 district supervisors from 50 of Colorado's 75 districts attending. Governor Knous and Louis Bromfield were the principal speakers at the Association banquet over which Walter A. Groom, State Association president, presided. Kent Leavitt, president of the National Association of Soil Conservation Districts, was the featured speaker on the second day.

The banquet was marked by the announcement of a $2,500 soil conservation contest by Lowell Watts, farm program director of radio station KLZ, and Palmer Hoyt, publisher of the *Denver Post*. Under the contest rules, $500 cash awards will go to the five soil conservation districts in Colorado doing the best conservation job in 1948.

Just prior to the observance James H. White, editor of *Western Farm Life*, and the late Hal Renollet, farm program director of radio station KOA, announced a "S—W—A—P" program, the letters denoting "Soil, Water, Animals, People."

Leavitt and Bromfield talked to several groups while in Colorado, and the *Denver Post* and *Rocky Mountain News* gave extensive coverage of the Association meeting and the Week's observance.

While Denver was the hub of operations, there was hardly a city, town or village in Colorado which failed to stress the importance of soil and water conservation through every available media.

Scores of daily and weekly newspapers carried illustrated feature articles about conservation accomplishments in local districts. Most editors wrote editorials stressing the importance of soil conservation, and many newspapers used conservation quotations as "fillers" during the Week. State newspapers carried 174 locally-sponsored soil-conservation advertisements for a total of 3,700 column inches.

Nearly every radio station in Colorado featured appropriate programs during the Week. Practically all farm programs on stations KOA and KLZ in Denver were given over to soil conservation for the entire week. Transcribed programs by Secretary of Agriculture, Clinton P. Anderson; Hugh Bennett, Chief of the Soil Conservation Service; M. L. Wilson, Director of the U. S. Extension Service and several others, were carried by stations throughout the State.

Motion pictures on soil conservation were shown in public theaters, and before schools, civic clubs, churches, fraternal organizations, war veterans, women's clubs, Boy Scouts, and farm organizations. Attendance ran high in the thousands.

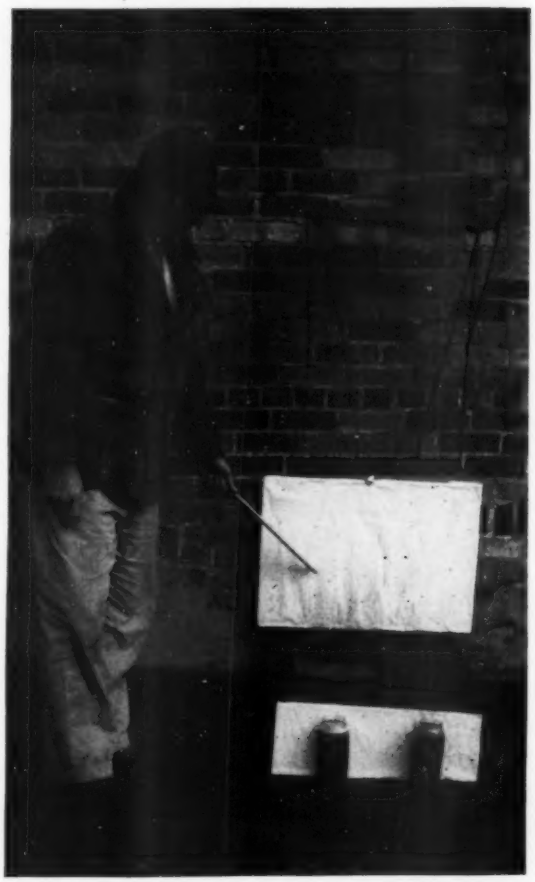
Scores of conservation talks were made before schools, civic clubs, PTA organizations, and sportsmen's groups such as the Izaak Walton League, Rod and Gun, and others. Louis Bromfield addressed the Broadmoor and Pike's Peak Garden Clubs in Colorado Springs, and Cyril Luker, regional conservator, spoke before several farmer and civic club groups in Trinidad and Grand Junction.

Various types of exhibits and displays were featured at the 2-day meeting of the Association of Soil Conservation Districts in Denver, and in banks, newspaper offices, and other public places in many parts of the State.

In addition to hearing conservation talks and seeing conservation movies, many schools conducted soil conservation essay and poster contests.

When delegates to the National Association of Soil Conservation Districts convene for the annual meeting in Denver next February, they will find a State thoroughly alert to the importance of conserving soil and water and eager to cooperate in strengthening the district program of better land use.

WESTERN GULF



A. F. Urbanovsky, conservation aid, demonstrates operation of device he made to show effect of rain on bare and unprotected soil.

SEEING IS BELIEVING.—A home-made device that simulates the erosion of soil by rain is proving of practical value in interpreting the research work of W. D. Ellison for farmer groups and for businessmen attending service club meetings.

Built by A. F. Urbanovsky, conservation aid, the "rain machine," as we call it, is a welded metal box 18 inches long, 20 inches wide and 7 inches deep. It stands on 6-inch legs and has a detachable rack for holding the "rain" box.

A welded partition divides the box into two compartments, each 10 inches wide, the front being 1 inch lower than the back. A lip at the front of each compartment is fixed to hold the soil 6 inches deep and to let the runoff water flow into fruit jars. The soil in one compartment is protected with a cover crop of vetch or clover; in the other compartment the soil is bare.

The welded rack is bolted to the soil box with two wing nuts for easy assembling. It is made to hold the box of water directly over either the cover crop or the bare soil.

The water container is a tin box 10 inches wide, 18 inches long and 4 inches deep. It has holes in the bottom. Wool yarn is run through pairs of holes and cut off an inch below the bottom so that the water falls in drops like rain rather than in a stream.

A rectangle of cardboard covered with white paper is placed at the back of the box to show the erosive effect of raindrops on bare soil and the absence of erosion on protected soil. In actual operation it is advisable to use a cardboard partition to keep soil particles from splashing from the bare soil to the cover crop. Otherwise the runoff from the protected soil would also be muddied.

This simple device has helped us a lot in showing the erosive effect of rain on unprotected soil and the need of vegetative cover in reducing or preventing erosion. We have been gratified by the favorable comments from farmers and business men who have seen the apparatus in operation.

—Robert W. Gillespie, Jr.
Work Unit Conservationist
Whitesboro, Tex.

SOUTHEAST

EXCELLENT EXAMPLE.—The Supervisors of the Central Georgia Soil Conservation District have paid for 29 new subscriptions and 8 renewals to Soil Conservation Magazine. "All supervisors of the district subscribe to and enjoy the Soil Conservation Magazine so much we are glad to see many others subscribing to it too," writes H. G. Hatcher, secretary-treasurer.

SOMETHING OLD, SOMETHING NEW.—A reasonable facsimile of a modern farm water-disposal system, including variable-grade, channel-type terraces and meadow outlets, was described 110 years ago in a letter from A. W. Veneable to the *Farmers Register*, published at Petersburg, Va. Paul Tabor ran across the letter in looking through an old issue of the magazine, dated February 1, 1938. The letter in part follows:

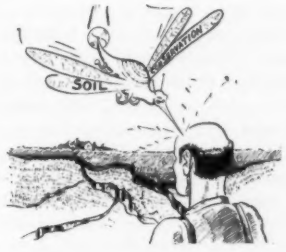
"A bed should be thrown up by the plough, 10 or 11 feet wide, graduated with sufficient fall to discharge the water, with a deep water furrow on the upper side of the bed leading to the first ravine, where there is a grass plat to receive the water and conduct it off. The bed is ploughed up with the rest of the field and cultivated with it, always taking care that the bed is left in the same place and the furrow opened with the plough. . . . The beds are made sufficiently numerous to drain all the water which falls on the land."

READABILITY WORKSHOPS.—Dr. Paul Irvine, director of the Alabama Research Interpretation Council, and Robert Leigh, his assistant, have completed a series of six 2-day writers' workshops for all field personnel of the Soil. Conservation Service in Alabama. The workshops were designed to teach the principles of writing short, concise sentences, and using small words and personal references to make the writing more readable. The 123 Service employees in Alabama who received this type of training included the state conservationist, the two assistant state conservationists, the state soil scientists, the work unit conservationists, the P–1 soil conservationists, and those aides who occasionally write news columns or feature stories.

The Council estimated that Service employees through their news columns were reaching approximately 20 percent of the farmers before taking the course and have increased their reading audience to 38 percent of the farmers. In other words, they are reaching 85 percent more of the potential farmer audience than they were before the training was given. State Conservationist O. C. Medlock expressed the opinion that the course would result in more readable farm plans, as well as news material.

EDITORS GET SUBSCRIPTIONS.—Supervisors of the Coosa River Soil Conservation District in Alabama have sent in subscriptions to Soil Conservation for 13 newspaper editors in the district. Fifty additional subscriptions will be sent to all the high schools in the district when the schools reopen in September, J. J. Stroup, district conservationist, reports.

SOUTHWEST



CONSERVATION IS CONTAGIOUS.—When Bob Hardgrave's farm near Cottonwood, Ariz., in the Bridgeport Soil Conservation District was "remade" in a day, back in April of this year, the supervisors hoped that it would be more than just a show. They hoped that the soil conservation methods demonstrated there that day would sell other farmers on the value of land leveling, terracing, irrigation improvements and the various other practices that were put into effect.

Nor were they disappointed. Ever since, there has been a steady stream of inquiries and comments about the exhibition, and before the big day was over, one farmer made arrangements to have his land leveled, like the job that was being done on the Hardgrave farm.

LAMBING GROUNDS BENEFIT.—Felix Valerio and Daniel Romero, sheep ranchers in the Taos Soil Conservation District of New Mexico, saved at least $200 this spring as result of a stock tank and diversion they built as part of their soil conservation plan.

With engineering assistance provided through the district, these men finished a small off-channel stock tank and diversion just before lambing time. The tank filled before lambing started and eliminated the need for hauling water to the lambing grounds—an operation which would have cost them $200.

Two tanks had previously been built in the arroyo but had silted up. The off-channel tank, designed by the Soil Conservation Service, will give them service for a much longer time since the heavy material of the arroyo bottom will not pass through the diversion. The tank is located in dry winter range and used for temporary livestock water during the winter and spring.

CANAL LININGS.—Water conservation research now under way in Cache County, Utah, may soon provide the answers to many western irrigation companies who know they are losing excessive amounts of water through seepage from their canals.

The Richmond Irrigation Co., whose canal has been in operation since about 1887, found out last fall that they were losing half their water supply in the first one-third mile of canal. James R. Barker, Utah State extension irrigation specialist, helped them measure their losses and then the board of directors went to Dr. C. W. Lauritzen, of the Division of Irrigation, Soil Conservation Service. Dr. Lauritzen, who has been experimenting with various kinds of canal linings in the SCS irrigation research laboratory at Logan, didn't know the answer but offered to try out some of his findings on the Richmond Canal.

With cooperation from the canal company and several firms which supply canal lining materials, Dr. Lauritzen has been installing 1,800 feet of canal linings, using varying thickness of concrete, concrete with different surfaces and reinforcement, different concrete mixtures and various methods of application. Some sections will have concrete sprayed on, others will be poured and still other sections will be lined with pre-cast concrete blocks.

Exact cost records are being kept and studies made as to their durability and suitability for use in that locality. They hope that before long recommendations can be made to other irrigation canal companies which will help solve this serious problem in the western states where water supplies are all too often limited.

SMOOTH FLOW OF WATER.—The leveling of 31 acres of irrigated land has resulted in increased crop yields which paid the cost of the work and showed a $700 profit for the owner, Charles Aukland of Olney Springs, Colo., in a single year.

Aukland is a cooperator with the West Otero Soil Conservation District and asked the district and the Soil Conservation Service for help in improving his irrigation system. Some parts of his fields were not getting enough water, while ponds were forming in the low spots.

His conservation plan included combining the two fields, leveling the land, removing old dikes and constructing a new irrigation system. The leveling cost $1,800, high because long hauls had to be made in moving the dirt. But his 1947 crops brought him $2,500, or $700 more than the cost of improvements.

Besides that, Aukland reports that 30 percent less water was needed after leveling and much better crops were produced than in former years. Equally important, the labor cost of irrigating was reduced 50 percent, and Aukland is convinced that this more efficient use of water will help reduce the hazard of high water table which is prevalent in Growley County.

NORTHERN GREAT PLAINS

TREES TOOK A HAND.—An 8-year-old shelterbelt got a figurative pat on the back recently from Ernest Fuhrman, near Norfolk, Nebr., a cooperator with the Stanton Soil Conservation District, for its part in helping him win the 1947 corn-yield contest sponsored by the Nebraska Extension Service.

Fuhrman's yield from a 10-acre plot was 106 bushels per acre, the highest in the county.

"Altogether, I had 90 acres of corn north of the shelterbelt, including the 10-acre contest plot," Fuhrman said, "and it was quite evident that the protection the trees gave the field made a lot of difference.

"The best corn was near the shelterbelt. The yield tapered off as the distance from the trees increased."

The whole field yielded unusually well, in view of the scorching, dry weather of July and August. Oats with sweet clover were grown in 1946 and 10 tons of manure per acre were applied in the spring. No commercial fertilizer was used.

The whole field was farmed on the contour, with a soil-conserving rotation since 1942, as part of the farm conservation plan that Soil Conservation Service technicians helped work out. The trees had been planted by the Forest Service in 1939.

Fuhrman says that contouring and the condition of the soil as a result of rotation made it possible for him to save a lot of the spring's heavy rainfall. Then, when the heat and dry weather came, there was a good moisture reserve, while the shelterbelt conserved moisture by protecting the field from hot, dry winds.

In addition to contouring, Fuhrman's conservation plan includes seeding of grass on land not suited for cultivation, establishment of grassed waterways, and improved pasture management. He plans to plant another shelterbelt.

POTHOLE PROBLEM.—Where formerly he had more than 30 part-time potholes scattered over his cropland to cause trouble, George Bakke now has one good-sized, year-around slough that is a good place for wildlife. Bakke farms near Stanley, N. Dak., and is a cooperator with the Two Creeks Soil Conservation District.

Bakke drained most of the potholes into the larger one as part of the farm conservation plan which he worked out with the help of A. P. Berglund of the Soil Conservation Service. The others were drained into a natural drainageway.

The Bakke farm of 2,300 acres, about half cultivated and half pasture, is a rolling glacial area, where there are numerous low places for water to accumulate with no way to escape. Generally, these potholes are full early in the season, when crops are planted, but dry up during summer.

"They caused a lot of trouble," Bakke said. "We had to farm around them in spring, and when they dried out later in the summer they were weed patches. Usually we couldn't get in to cut the weeds, so they went to seed, and that caused more trouble.

"Saving the cost of pulling out machinery after it got stuck and saving the cost of repairs so caused are worth the expense of draining. You can't always tell how close you can go to a pothole with machinery, and when you make a mistake, you're stuck.

"This year, however, we were able to farm the pothole areas with the rest of the land. And, you know, those potholes are about the best land on the place."

About 40 acres had been covered by the potholes. SCS technicians laid out the drainage system and supplied the technical services when it was built by a contractor.

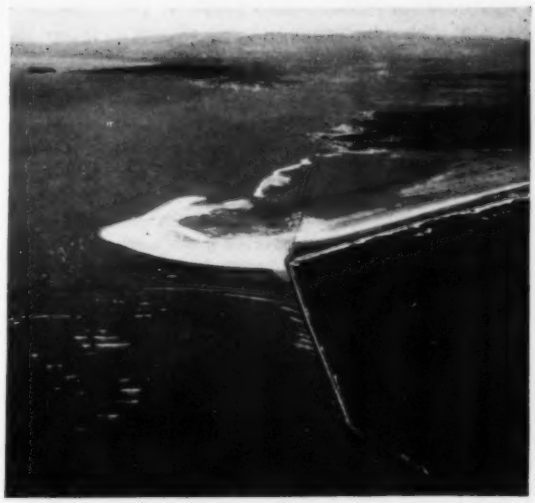
The slough into which most of the potholes empty is one that could not be drained. It covers about 6 acres, and now has about 4 feet of water. The growth of weeds and other water-loving plants is appreciable already and gives wild fowl excellent cover. SCS men predict that small fur-bearers will appear there soon.

Bakke is following a grain-fallow rotation and is giving stubble-mulch fallow a trial on part of his land as part of his conservation plan.

He raises about 100 head of cattle, and follows a controlled grazing system under which he delays spring grazing until the grass has made a good start and then, during the grazing season, uses different parts of the pasture in succession.

PACIFIC

TRAGIC RIDE TO SEA.—Enough soil to cover 44 farms, each 80 acres in size, to a depth of 6 inches went past Portland every day, on the average, during the Columbia River flood, according to measurements of the Soil Conservation Service.



Aerial view, mouth of Columbia River at height of 1948 flood. Jetty in right foreground divides clear water of Pacific from soil-laden floodwaters of Columbia.

J. H. Christ, Portland regional head of SCS, estimated the silt content of the river during the first 21 days of the flood at more than 78,000,000 tons, most of which represented valuable topsoil washed off farm and grazing lands throughout the Columbia basin. Much of this soil is now at the bottom of the Pacific. Large quantities, however, according to Christ, will be deposited in the form of silt and mud on bottomland farms along the lower Columbia, in drainage and irrigation ditches, on highways and city streets, where its removal when the floodwaters subside will add heavily to total flood costs.

Immediate value of the lost soil was set by Christ at 11 million dollars. He estimated the long-time loss to the nation in capitalized net earning capacity at between 75 and 80 million dollars.

At the peak of the flood, muddy waters of the Columbia discolored the ocean as far out as 20 miles. A huge, chocolate-colored fan at the mouth of the river, clearly visible from the air, was estimated to cover more than 300 square miles.

UPPER MISSISSIPPI

CODE OF AGRICULTURAL ETHICS.—A good agriculturist recognizes the basic nature of the soil and its relationship to all life and the economy of living. He knows that all individual health, happiness and accomplishment as well as that of community, nation, and the world goes back to this indispensable soil.

Recognizing this basic nature of the soil, a good agriculturist will accept the philosophy of stewardship of the land, appreciating that he is holding in trust a parcel of the world's wealth to be used for the good of himself and his fellow man.

The good agriculturist will, therefore, accept the principles of proper land use to protect as well as better the land that he uses.

The good agriculturist will adopt accepted soil practices to protect himself, his neighbor, community, and the nation from flood menace and wind-blown soil. He recognizes that all floods have their origin at the place where the water falls and that all dust storms have their origin in the unprotected fields of the farm.

The good agriculturist will shun cash cropping except as it is a temporary loan from the great wealth reserve of our soil, a loan to be repaid with interest.

A good agriculturist will help to seek means which will prevent the unscrupulous from exploiting the wealth of whatever land is temporarily in their hands and see that no land is left as a bankrupt, tax-delinquent public charge.

A good agriculturist will recognize that the science of nutrition is yet in its infancy, but current observations indicate that there is an inseparable relationship between robust, individual and national health and a fertile soil well supplied with humus, organisms, and minerals.

A good agriculturist will, therefore, return to the soil all possible organic material as well as replacing depleted mineral reserves. He will do this by adopting the method best suited to the conservation of all elements in animal manures and animal and vegetable wastes, and he will refrain from the unwise practice of burning crop residues which should return to the soil as organic material.

A good agriculturist will appreciate that man has a place in the animal kingdom that he will only succeed in holding if he does his part in helping to maintain a balance in nature. If man fails to find and accept his place in the scheme of things, he will surely bring about his own destruction.

A good agriculturist will keep himself informed on the latest research development in his own field as well as to re-explore the old. He will exert individual leadership as well as cooperate in the community effort of his fellow man. Universal recognition and acceptance of this individual responsibility, coupled with a willingness to cooperate, will cure most of the social, economic and spiritual ills that at present beset our agricultural state.

Lastly, a good agriculturist accepting these responsibilities can insure to posterity an inexhaustible resource of rich and productive soil. In so doing he can assume his rightful place in the honorable and indispensable professions that serve all mankind.

—By Dr. M. M. Hargraves, Mayo Clinic, Rochester, Minn., at the annual meeting of Minnesota Association of Soil Conservation Districts.

GOOD PASTURE SAVES CORN.—One acre of bromegrass-alfalfa saved from 10 to 22 bushels of corn and cut the hay and protein needs in half, aver M. L. Peterson, G. M. Browning, and Rex Beresford, SCS research and Iowa Agricultural Experiment Station, Ames, Iowa. However, it took a longer time to fatten the cattle on pasture. Under normal conditions, this delayed marketing may be accompanied by a seasonal decline in prices received for fat cattle.

RESEARCH POINTERS

Prepared by J. H. Stallings

FLAME WEEDING.—The use of flame for selective burning for the control of weeds and grasses within a specific crop is becoming a practical possibility. Flame weeding equipment consists of a tractor-hitch cultivator with burners that direct flames into the crop rows and between plants while the cultivator is mechanically weeding between the rows in the same operation. Flame cultivation has been tested and proved in many row crops.

HOW TO BOOST FORAGE.—Production of forage can be doubled and trebled by the establishment of a good stand of legumes and bromegrass on old blue grass pastures, according to Orville E. Hays, SCS research, LaCrosse, Wis. This is equivalent to doubling your pasture acreage.

Most pastures need 2 or 3 tons of lime per acre. They should be worked thoroughly with a spraytooth and disc; add 400 pounds of 0–20–20 fertilizer and seed to a mixture of 8 pounds of alfalfa, 5 pounds of red clover, 1 pound of ladino clover, and 6 to 8 pounds of bromegrass seed per acre. Plant small grain at rate of 1 bushel per acre for nurse crop.

FALLOW FACT.—Subsurface tilled, trashy fallow has been the only fallow which has not blown at some time or other at Froid since 1940, alleges T. S. Aasheim, SCS research, Bozeman, Mont. Some wind erosion occurred every year, but never on subsurface tilled plots where the stubble was utilized.

VIGOR OF RANGE GRASSES.—Vigor, composition, and density of the vegetation are the most important criteria of range condition, believe J. E. Weaver and R. W. Darland, SCS operations, Lincoln, Nebr. Vigor is commonly measured by the size of bunches or clumps and especially by the number of stems, the absence or presence of dead centers, and the partial or complete death of tufts or bunches. An excellent test of vigor under con-

ditions favorable for development is that of prompt renewal of growth in spring, after grazing, or after transplanting.

The degeneration of excellent or good native pastures and ranges into medium or poor ones is always preceded by a decrease in vigor of the most nutritious and best-liked grasses. Decreased vigor may result from overgrazing or from drought.

If this sign of range deterioration is observed and stocking rate is decreased or grazing deferred or the pasture completely rested, the range will usually recover and often improve.

PROPER STOCKING PAYS.—A range properly stocked will produce more pounds of beef and stay in better condition than it will if overstocked, states George A. Wood, SCS operations, Pleasanton, Tex. The calf crop was increased 90 percent and beef production increased 2,140 pounds annually over a 3-year period by reducing the number of cows from 175 to 85 on a 1,270-acre ranch. The average weight of the calves was increased from 250 to 390 pounds. The condition of the range improved and the rate of erosion was reduced.

SOIL AND WATER LOSSES.—Wheat alternating with fallow had a maximum soil loss of 80.8 tons of soil per acre for a 12-year period as compared with a total loss of 274.4 tons per acre for bare uncultivated land, states D. E. Stephens, SCS research, Corvallis, Oreg. The soil loss where wheat alternated with fallow ranged from 1.9 tons per acre to 80.8. The highest soil loss resulted in the lowest average yield. Spring wheat after fallow lost 23.9 tons of soil per acre over a 5-year period while spring wheat followed by Hubam clover turned under lost only 3.7 tons. These findings were developed in studies conducted in Washington, Idaho, and Oregon with crop residues, tillage, crop rotations, and other practices.

SOUND LAND USE BOLSTERS PASTURES.—Sound land use and practical conservation farming is the first line of defense against erosion and provides an opportunity for greater production, alleges Harley A. Daniel, SCS research, Guthrie, Okla. Livestock make grassland useful and restore to the soil the life-giving elements used by growing plants. Soil conservation and balanced farming are being accomplished logically and profitably by sound development of the livestock industry.

COVER CROPS SAVE SOIL.—Farmers should use more cover crops in corn and perhaps other row crops, according to H. A. Nelson, G. B. Browning, and J. B. Peterson, SCS research, Ames, Iowa. Cover crops protect the soil surface against the action of raindrops from August to May, during which one-fourth of the annual soil losses occur. They increase the soil's resistance to erosion during May and June by adding organic matter to the soil. One-half of the annual soil losses occur during this period. If the cover crops contain legumes they add nitrogen to the soil and increase its productive capacity.

STUBBLE MULCH TILLAGE.—Stubble mulch tillage, when properly practiced with the modified moldboard plow or some other similar surface implement, is well adapted not only for erosion control but also for crop production, finds Hugh C. McKay, SCS research, St. Anthony, Idaho. The modified moldboard plow leaves more straw on the surface, loses less soil and produces greater wheat yields than either the one-way disk or moldboard plow. The burning of crop residues was the greatest single factor causing soil loss. The highest soil loss, 14 tons per acre, occurred on the straw-burned, moldboard-plowed plots. The least loss, 1 ton per acre, occurred on the modified moldboard-plowed plots. The differences in grain yield resulting from various treatments are not large, but they are large enough to be significant.

ELIMINATE BITTERWEED.—Bitterweed is troublesome on ranges that are in poor or fair conditions but not on ranges in good or excellent condition, aver O. L. Fenner, SCS, San Angelo, Tex., and E. B. Keng, SCS, Sonora, Tex. Building grazing lands up to good and excellent condition is the way to control bitterweed. Grazing lands get to be good or excellent forage producers, or they are able to stay that way, through sound range management. Use your forage so that grass growth and the amount of grazing even up and leave a pretty fair quantity of the plants to die and return to the soil year after year.

GRASSLAND CONSERVATION.—Simultaneous improvement of the soil and grass and good grazing management are the principal foundation stones for conserving grassland, thinks W. B. Allred, SCS, Fort Worth, Tex. Grass is the chief capital asset on grazing land. It should be given the care accorded premium field crops. It dies or flourishes largely in relation to its treatment. Artificial aids to range improvement result in failure unless wise grazing is practiced. Where forage is grazed correctly, year after year, there is usually little need for artificial aids. Give the grass full opportunity to produce all it can and the soil and grazing industry will be safeguarded.

DEGREE OF RANGE USE.—Livestock have marked preferences for certain kinds of range plants, states Ben Osborn, SCS, Fort Worth, Tex. They will graze the more desirable plants before using the less palatable ones. It happens, too, that the plants which stock select for grazing first are generally the ones which are most nutritious and which have the capacity for producing the greatest volume of feed. Consequently, if range is to remain in condition to produce the greatest amount of the best quality feed year after year, grazing must be limited to avoid damaging the preferred plants.

The amount of grazing that has taken place in a pasture, with the degree of use that is safe for the kinds and amounts of vegetation present under the current season's growing conditions, can be determined by applying a simple scale developed for the purpose. The scale recognizes 4 degrees of use. Its use enables the ranchman to determine if his ranch is being "lightly," "moderately," "heavily," or "severely" used.

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DETROIT

Present Rate of Land Damage

1. Around 25 percent of the cropland of the country is being damaged at a rapid rate by erosion, according to the most recent estimates of the Soil Conservation Service. This is an area of approximately 115 million acres of cropland, located on farms totaling about 260 million acres. The productive capacity of much of this highly vulnerable land will be permanently damaged, and some 500,000 acres a year ruined for further cultivation, unless it is placed under a sound conservation farming system within the next 10 to 15 years. To be on the safe side—to prevent such irreparable and unnecessary waste—conservation treatment should be completed on these lands by 1960.

2. On another large area—around 120 million acres—of cropland, erosion is proceeding at a less rapid but still serious rate. This cropland is located on farms totaling some 250 to 280 million acres. To prevent serious or irreparable damage to these lands, they should be safe-guarded by conservation treatment within the next 15 to 30 years—by 1970 to be safe.

3. In addition to these two groups of land, some 215 million acres of cropland on farms comprising some 600 million acres are being damaged at a considerably slower rate. While a somewhat longer period of time could be used in treating such land, the Service is convinced it would also be more economical to complete the planning and application of basic conservation measures on these lands by 1970. They are often so intimately associated with the areas that are being damaged more rapidly that they frequently cannot be economically treated separately.

	Million acres
Cropland being damaged at rapid rate	115
Cropland being damaged at serious rate	120
Cropland being damaged at slow rate	215
Total	450

NOTE: All Soil Conservation Service estimates are based on the most accurate information available and are subject to change as more accurate information becomes available.

Light use is indicated when only the most palatable plants are grazed, and when portions of the area are untouched. Moderate grazing removes 50 to 75 percent of the current year's growth of preferred plants. Heavy grazing is indicated by the best plants being almost completely grazed, while the inferior ones are moderately used. Severe use is indicated when all plants are closely grazed with little distinction between palatable and unpalatable species.

INCOME INCREASED BY IMPROVING LAND.—A substantial increase in farm income can be realized on farms that adopt recommended land-improvement practices, believes Karl S. Landstrom, SCS research, Pullman, Wash. The increases are possible because the gain in farm receipts made possible by land improvement is more than enough to meet the higher total costs of production, including a charge for interest and depreciation on investment in fixed farm improvements required as a part of the program. The amount of these increases in income, even on the poorer land, is sufficiently large to indicate that the application of measures currently recommended would involve little risk of financial failure even though the yield responses actually obtained turned out to be substantially less than those assumed in connection with the farm budgets.

BEACHGRASS AND DUNEGRASS.—The survival of transplanted clones of European beachgrass on coastal dunes is determined by maximum temperatures and not by precipitation, discovered Robert L. Brown and A. L. Hafenrichter, SCS Nursery Division, Portland, Oreg. Survival can be predicted from the average maximum temperature for 72 hours following planting. Survival of 50 percent may be expected when maximum temperatures do not exceed 55° F. A survival of at least 50 percent is required for stabilization of eroding dune sand.

The survival of American dunegrass was much lower than for European beachgrass. Dormancy at planting time is the chief factor of survival.

The addition of 40 pounds of nitrogen per acre is the most important factor influencing the cost of planting stock. Clones produced with nitrogen cost approximately one-half as much as those produced without fertilizer. Still more important is the fact that it brought production almost to its maximum in one year.

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